

# CLAIMS

1. A dental handpiece (1) of the type comprising mechanical components, in particular a tool-holder assembly for the attachment and rotational driving of a dental instrument about a drive axis (6) and an assembly for the transmission of movement, said mechanical components being mounted in the interior of a body (2) having a head (4) and a handle (3), characterized in that the body (2) is formed from a single piece or envelope (8), of which one part serves as a handle (3) and the other part constitutes a head, which head comprises a first housing (26) opening out with at least one opening (7) so dimensioned as to permit the introduction of the component parts of the head and their assembly in the interior of the latter, which handle comprises a second longitudinal housing (33) having a rectilinear axis (7) and opening out, on the one hand, at the extremity of the handle via an opening (81) and, on the other hand, in the first housing via a lateral opening (32), which opening (81) is so dimensioned as to permit the introduction of the internal component parts of the handle and their assembly in the interior of the latter.

2. The dental handpiece as claimed in claim 1, characterized in that the axis (6) of the head and the axis (7) of the handle between them form a predetermined angle  $\alpha$  for the production of a counter-angled handpiece.

3. The dental handpiece as claimed in claim 2, characterized in that  $\alpha$  lies between 100 and 130°.

4. The dental handpiece as claimed in claim 1, characterized in that the axis (6) of the head and the axis (7) of the handle are parallel and are displaced from one another to permit the production of a straight handpiece.

5. The dental handpiece as claimed in one of claims 1 to 4, characterized in that the envelope (8) is

produced by molding.

6. The dental handpiece as claimed in claim 5, characterized in that the envelope (8) is produced in polymer material.

5 7. The dental handpiece as claimed in claim 6, characterized in that the envelope (8) is produced preferably in PEEK.

8. The handpiece as claimed in one of claims 6 to 7, characterized in that it comprises electrical  
10 connection means constituted by a chain of component parts for the mechanical transmission of the rotational movement.

9. The handpiece as claimed in claim 8, characterized in that the chain of component parts for mechanical and  
15 electrical transmission is constituted as follows :

- inside the handle, the electrical current passes from a socket (11) to a fixed external race of a first bearing (12), and to a first spring (13), then to a fixed external race of a second bearing  
20 (14), then to a ring (15) that is retained axially on a first shoulder in the envelope (8), and then to a spring (16) that is retained axially by a second shoulder of the envelope (8), the first and second bearings (12, 14) supporting a transmission  
25 shaft in the longitudinal axis (7) of the handle, or the first axis of the handpiece (1), and the springs (13 and 16) being compression springs of which the coils are arranged externally to the transmission shaft (7),

30 - in the head (4) of the counter-angle, with its second axis or drive axis (6) supporting two ball bearings, namely an upper bearing (17), of which the external race interacts with the second spring (16) of the handle, and a lower bearing (18), of  
35 which the axial play is taken up with the help of an elastic washer (19), a barrel pinion (20) mounted on the drive shaft (6) comprises teeth (21) engaging with the teeth (22) of an output

pinion (23) of the handle, the barrel pinion (20) being conductive and integral with the interior races of the bearings, it ensures the conduction of electricity to the instrument (5) and the mechanical driving of the latter.

10. The handpiece as claimed in one of claims 6 to 7, characterized in that the means of electrical connection are constituted by a conducting wire.

11. The handpiece as claimed in one of claims 6 to 7, characterized in that the means of electrical connection comprise an elastic connection device (88) in order to provide the electrical connection between the mechanical transmission component parts and the head of the tool.

12. The handpiece as claimed in claim 11, characterized in that the connecting component comprises a first peripheral segment (89) engaged in a groove (90) made in the race (15) of the bearing (14) and a second peripheral segment (91), opposite to the first segment, which is supported against the head (40) of the instrument.

13. The handpiece as claimed in claim 5, characterized in that the envelope is produced in material of type MIM.

14. The handpiece as claimed in one of claims 1 to 13, characterized in that the internal housing (26) in the head is adapted to receive a tool-holder assembly composed of the mechanical transmission components of the head, and to receive a means of tightening and releasing (25) the tool or instrument (5), said housing opening onto the head via an opening (27) that is capable of being closed by means of a stopper or a cap (28), or by means of a push-button.

15. The dental handpiece as claimed in one of claims 1 to 14, characterized in that the head contains a turbine, and the body of the handpiece comprises fluid channels that are required for its function.

16. The dental handpiece as claimed in one of claims 1

to 15, characterized in that the head exhibits a cavity intended to contain a solid grease that is released on each occasion of use via an orifice from the separating wall between the cavity and the barrel in order to lubricate the barrel.

17. The dental handpiece as claimed in one of claims 1 to 16, characterized in that it comprises an arrangement for attaching a dental instrument to a tool-holder assembly for the attachment and rotational driving of a dental tool or instrument about a driving axis (6), said tool-holder assembly (24) being integrated into a head (4) of a dental handpiece and connected to a movement transmission assembly integrated in a handle (3) of the said handpiece (1) and composed principally of a deformable and elastic means of tightening and releasing in the form of a belt (25), of which at least one part exhibits a section adapted to engage in a groove or annular slot that is provided in the upper part of the instrument and is adapted to retain the said instrument by tightening, said means of tightening and releasing also comprising means for the application of releasing forces for canceling the tightening forces for the purpose of releasing the instrument.

18. The dental handpiece as claimed in claim 17, characterized in that the attachment arrangement is detachable in relation to the tool-holder (24).

19. The dental handpiece as claimed in one of claims 17 to 18, characterized in that the belt (25) made of a deformable, elastic material exhibits a form that is essentially that of a parallelogram having a central zone (39) provided for the purpose of retaining the head (40) of the instrument tightly in place at the level of a slot, the large diagonal of the parallelogram being provided in order to ensure that its two extremities extend diametrically beyond the envelope of the head (4) as two projections (42), each located in a notch (43) in the head, each of the

projections constituting means for the application of forces manually and directly for releasing the belt.

20. The dental handpiece as claimed in claim 19, characterized in that the belt (25) comprises detachments (45) provided in the proximity of the projections (42) and resting on the periphery (46) of the housing (26) of the head.

21. The dental handpiece as claimed in claim 19, characterized in that the elastic belt (25) exhibiting the form essentially of a parallelogram and having a central zone (39) provided in order to retain the instrument tightly in place comprises two ears (54) forming projections perpendicular to the plane of the belt and situated on the same side as the latter, which two ears constitute means for the application of tightening forces via the intermediary of a barrel pinion positioned on the head of the handpiece.

22. The dental handpiece as claimed in claim 20, characterized in that the ears comprise conical flanges (60).

23. The dental handpiece as claimed in one of claims 19 to 22, characterized in that the belt exhibits a conical part (64) arranged on the undersurface of the central zone (39).

24. The dental handpiece as claimed in claims 21 to 22, characterized in that the attachment arrangement also comprises a push-button exhibiting a plurality of component parts, namely:

- an elastic ring (56) at the lower extremity, which retains the push-button on the head (4),
- an intermediate elastic zone (57), which plays the role of a return spring for the push-button,
- an internal cylindrical insert (58), which, when the push-button is pressed, permits the deformation of the elastic belt to be controlled, thereby releasing the tool.

25. The dental handpiece as claimed in one of claims 22 to 24, characterized in that the insert (58)

comprises an internal conical form (59) in order to interact with the complementary conical flanges (60) of the ears of the belt.

5 26. The dental handpiece as claimed in one of claims 17 to 18, characterized in that the deformable, elastic belt exhibits the form of a split ring (65) or a split annular clip (72) comprising an annular shoulder (66)(79) adapted to engage in an annular slot (28) in the instrument and a conical part (71) in order to  
10 interact with a complementary conical part of a push-button.

27. The dental handpiece as claimed in claim 26, characterized in that the split ring comprises a conical part (73) provided on the undersurface of the  
15 split ring for the introduction of the instrument.

28. The dental handpiece as claimed in claim 27, characterized in that the attachment arrangement also comprises a push-button (55) guided axially by one or more sectors (87) arranged on the undersurface and each  
20 terminated by a conical extremity (70).

29. The dental handpiece as claimed in claim 27, characterized in that the attachment arrangement also comprises a push-button (55) comprising elastic blades (75) cut into its cap and terminated by clipping slots  
25 (80) and a conical base (78).

30. The dental handpiece as claimed in one or other of claims 17 to 18, characterized in that the attachment arrangement also comprises a push-button for the application of releasing forces on the means of  
30 tightening and releasing.

31. The dental handpiece as claimed in claim 30, characterized in that the push-button is integral with the tool-holder.

32. The dental handpiece as claimed in one of claims  
35 30 to 31, characterized in that the push-button is retained by means of a clip in an opening in the head.